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PRO IT

[27/04/2010] The role of the R-12 missile in the history of the creation of nuclear missile weapons

EF Korchagin, former employee of RFNC-VNIIEF, nuclear weapons tester

The beginning of the development of missile weapons in our country occurred almost simultaneously with the beginning of the Atomic Project. On May 17, 1946, by resolution of the Council of Ministers of the USSR, appropriate structures were organized to manage all work on missile weapons. Already in 1955, the Missile Forces were organized as a separate branch of the military, which received the R-5M (1956), R-11M (1958) and R-12 (1959) missile systems. The adoption of the R-12 missile became an extremely important event because it was on the basis of missile regiments armed with a missile system with the R-12 missile that the Strategic Missile Forces were formed.

The R-12 missile itself occupies an important place in the development system of ballistic missiles (BM), being the first representative of a ballistic missile using high-boiling fuel components, and also being the prototype of all future intercontinental ballistic missiles. Among other things, the creation of the R-12 rocket led to the emergence of a design bureau competing with SP Korolev's OKB-1, which had a beneficial effect on the entire process of developing ballistic missiles.

The R-12 missile was developed as part of research work to study the appearance of future strategic missiles, carried out in 1950-1952. OKB-1. In 1953, the development of the preliminary design of the R-12 rocket was transferred to the Design Bureau of Plant No. 586. And in 1954, on the basis of the said Design Bureau, OKB-586 was formed, headed by chief designer MK Yangel. The missile had a flight range of 2000 km and a throw weight of 1600 kg.

The R-12 missile, as part of the ground and silo complexes, is perhaps the most honored long-liver: its military "service" lasted more than 30 years.

The R-12 rocket was used for combat launches with thermonuclear charges, which were detonated at the Novaya Zemlya test site:

- exercises "Rosa" (Strategic Missile Forces) - combat launches of a rocket with thermonuclear charges of project "49" on 09/12/1961 and 09/16/1961 from near Vorkuta on the battlefields on Novaya Zemlya in the Mityushikha area (on "Pankovaya Zemlya") ;

- in October 1962, R-12 missiles were launched at the Kapustin Yar state center in order to study the effect of nuclear explosions on rocketry.

On November 1, 1962, in the area of the Kapustin Yar state center, an operation was carried out to detonate the nuclear charge of an R-12 rocket at an altitude of 60 km to test the effect of a nuclear explosion on radio communications.

Nowadays, it is difficult to believe that liquid-propellant rockets of that time were equipped with combat thermonuclear charges that "flew" over the territory of the country. The test managers were located directly at the test site.

All tests were successful.

Caribbean crisis

During the Cuban Missile Crisis in 1962, 24 R-12 missile launchers (three special regiments) from the 13th Strategic Missile Division were deployed in Cuba. From September 9 to October 22, 1962, 24 ships with 42 R-12 missiles arrived in Cuba, of which 6 were training, and

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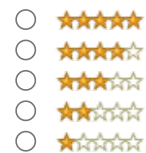
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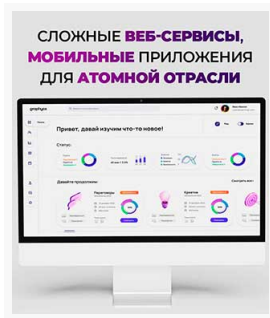
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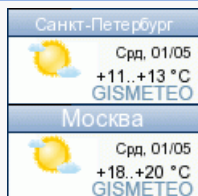


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Time and Fates

36 with nuclear warheads. About a third of the American territory from Philadelphia through St. Louis and Oklahoma City to the Mexican border fell within the range of the R-12 missiles. Within 48 days from the moment of arrival, the specially formed 51st Missile Division was ready to launch missiles from 24 launches.

Thanks to the peaceful resolution of the Cuban Missile Crisis, all R-12 missiles were removed from Cuba and the launch sites were dismantled.

The deployment of missile units with nuclear weapons in Cuba caused panic among the population in the United States, and also contributed to the peaceful resolution of the Cuban crisis and the withdrawal of American nuclear weapons from Turkey.

The role of the R-12 missile in the nuclear development system

The nuclear warhead of the R-12 missile, equipped with a thermonuclear charge - "product 49", occupies a very important place in the history of the creation of nuclear weapons in general and nuclear charges in particular.

The thermonuclear charge "product 49", a representative of thermonuclear charges of a two-stage physical design, was theoretically justified in 1957, during the process of creating a combat version of a two-stage thermonuclear charge for the first intercontinental ballistic missile R- 7.

The ideologists of the project of a new thermonuclear charge and the developers of its physical design were KB-11 theoretical physicists Yu.A. Trutnev and Yu.N. Babaev. Their direct participation in the work on creating a new physical scheme for a two-stage thermonuclear charge on the principle of "atomic compression" made it possible to carefully study the physical processes occurring during the explosion of a thermonuclear charge of this physical scheme, to understand and evaluate their significance. New ideas that emerged as a result of these works were embodied in the actual design of a new thermonuclear charge.

Field tests to test the functionality of the physical circuit of this charge and measure the parameters of its action were carried out on February 23, 1958, a month before the introduction of a unilateral moratorium on nuclear tests.

"According to the conditions of adaptation to specific carriers, "product 49" was developed in a smaller overall weight category compared to the RDS-37 charge, but its specific volumetric energy release turned out to be 2.4 times greater. The physical design of the charge turned out to be extremely successful; the charge was transferred to service and subsequently modernization took place associated with the replacement of primary energy sources" ["For the benefit of Russia. To the 75th anniversary of Academician of the Russian Academy of Sciences Yu.A. Trutnev", Sarov, 2002].

The road to field testing of "product 49" for its authors was not without difficulties and obstacles. It was included in the test plan after lengthy discussions. From the speech of AD Sakharov at the meeting of NTS-2 of the Ministry of Medium Machine Building in 1958:

"The matter of developing products based on the principle of "atomic compression" turned out to be more complex in a scientific sense than it seemed after the first successful explosion on November 22, 1955.... The great complexity of the processes of a nuclear explosion was revealed, making it necessary to experimentally test each type of thermonuclear weapon in a number of tests, some of which will inevitably fail."

The task of computational and theoretical substantiation of the performance and parameters of new thermonuclear charges turned out to be very labor-intensive and to some extent uncertain.

All these difficulties and uncertainties in the design of the thermonuclear charge proposed by the young theorists Yu. Trutnev and Yu. Babaev turned out to be "out of the question." It was not easy to agree with this.

At the same time, another thermonuclear charge, "44," with the same weight and dimensions as the charge "49," was being prepared for use in the nuclear warhead of the R-12 missile. The charge was designed



in direct analogy with the RDS-37 charge circuit, and its field tests were scheduled for February 27, 1958.

In field tests, one after the other, two two-stage thermonuclear charges were tested with the same weight and dimensions, with the same consumption of fissile materials, intended to equip the warhead of the same R-12 missile, but with differences in physical designs. Field tests were supposed to confirm the effectiveness of one or another physical scheme: a direct scheme of the "RDS-37 charge" type or a new version of the "charge 49" type scheme.

But field tests yielded unexpected results: for none of the charges the experimental parameters coincided with the expected calculated values. Charge "49" showed the value of the main parameter 1.5 times higher than the expected value, and charge "44" - 1.5 times lower than the expected value.

Repeated tests of the "49" charge (already with the standard parameters of the primary unit), carried out on March 21, 1958, three days before the introduction of the moratorium, showed complete agreement between the experimental and calculated expected parameters. Based on the physical design of the "49" charge, a whole series of thermonuclear charges were created with different explosion power values and different weight-dimensional parameters, which found wide use in equipping nuclear weapons carriers of the Soviet Armed Forces.

The thermonuclear charge itself - "product 49" - was put into service as equipment for nuclear warheads of various nuclear weapons carriers:

- March 4, 1959 - as part of the nuclear warhead of the medium-range strategic missile R-12 (8K63 missile system).

- June 19, 1959 - as part of the P-5 sea-based cruise missile complex. The complex was used to arm diesel submarines of three projects, as well as nuclear submarines of two projects.

From 1961 to 1969, "product 49" was equipped with several more sea-based ballistic missiles. In particular, in 1963, as part of the D-4 complex - the first Navy missile system with an underwater launch (firing range 1400 km).

*In the preparation, materials from the publication of **VM Botev**, a traveling engineer of the Scientific and Methodological Center RFNC-VNIIEF, who worked for many years in the structure of the Military Representative Office of VNIIEF, were used ((newspaper "New City" dated September 23, 2009, Sarov)*



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People knew how to work!

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